Diabetic foot ulcers: A key focus area for the Fiji Health Service Improvement Program

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Background

According to a collaborative document published by the International Diabetes Federation (IDF) and the World Health Organization (WHO), the Western Pacific Region (WPR) continues to be at the forefront of the type 2 diabetes mellitus epidemic[1]. The *Diabetes Atlas*[2] documents the current number of people with diabetes in the WPR at 76.7 million, which is estimated to increase to 112.8 million by the year 2030.

Of Fiji's population, 9.4% have been diagnosed with diabetes[2] and as many as three out of four people with diabetes remain undiagnosed. In developing countries, only two-thirds of people diagnosed achieve optimal disease management. Diabetes-related complications are believed to attribute to between 5% and 15% of a country's health care expenditures[1] with diabetes reducing life expectancy by 5–10 years.

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Individuals with diabetes are up to 15 times more likely to require a lower limb amputation than the general population[3] and diabetes-related complications remain the highest reason for non-traumatic amputation[4]. Lower limb amputations are associated with increased morbidity and mortality and higher treatment costs, which relate to an increased hospital length of stay and more intensive rehabilitation, with health expenditure 2.3 times higher than it would be in the absence of diabetes[5].

In 2006, podiatrists at Alfred Health's Caulfield Community Health Service (CCHS)/Caulfield Hospital (CH) were invited to become involved in the Fiji Health Service Improvement Program (FHSIP). The FHSIP was an AusAID-funded program for the Central/East division of Fiji. Sandringham Hospital (also a member of Alfred Health) was initially invited to participate in the project with the aim of improving key aspects of health care delivery in the region. Initial meetings with key stakeholders including the Fiji Ministry of Health, FHSIP Program Director and the Chief Medical Superintendent of Colonial War Memorial Hospital (CWMH) highlighted an unmanageable demand on CWMH, which is located in Suva. CWMH is the largest public hospital in Fiji and services an estimated 380,000 people per year. CWMH receives tertiary referrals from outlying hospitals and is the largest service provider of health care in the South Pacific. The Alfred Health team proposed a training package focusing on improving the function of the accident and emergency (A&E) department and the development of a Hospital in the Home (HITH) model. It was anticipated that this would reduce pressure on inpatient services at the hospital.

Senior medical and nursing staff, together with the Fijian Ministry of Health, identified diabetic foot complications as a contributing factor to demand for acute medical services. Anecdotal evidence and stakeholder feedback depicted an increase in frequency and degree of lower limb amputation occurring at CWMH. Due to its topography, it was reported that many Fijian residents presented to CWHM with late-stage sepsis secondary to diabetic foot complications resulting in limb and life-saving amputation. Current diabetic foot

services in Fiji are provided by nurses or nurse practitioners and are delivered at a number of sites throughout the division. Outlying community health services provide basic foot care to people with diabetes; however, these centres are resource-poor with little or no access to assessment tools, podiatric equipment or wound dressings. A more specialised service is available at the National Diabetes Centre (NDC) located in close proximity to CWMH. NDC staff are more skilled in debridement techniques and medical management; however, were still identifying slow or hard to heal wounds and a high incidence of lower limb amputation due to chronic infection.

Podiatry, a profession that is not recognised in Fiji, was introduced into the FHSIP in the hope that the provision of diabetes mellitus and foot disease education would assist in reducing the number of diabetic foot complications, thus having a positive impact on service demand. Podiatrists from CCHS had previously been involved in similar programs in Nauru, Samoa and Philippines.

Method

A training package was developed for nursing and medical staff from CWMH and surrounding health services of the Central/East division. The package was designed to cover basic foot and lower limb anatomy, pathophysiology of diabetes including common foot complications, identification of the high-risk foot, infection (identification and management), debridement and wound management, including choice of appropriate wound dressings.

The training package was modelled where possible on a high-risk foot service which includes primary, secondary and tertiary levels of service. Additional time was spent with NDC staff to create local champions who could ensure the program was sustainable once funding was exhausted. Training goals are included in Table 1.

Basic training was provided for nursing staff from CWMH and outlying island communities and recruitment to the training was coordinated by the NDC. Feedback following the initial visit and training indicated a desire for longer and more practical education sessions to complement the basic training package. Thus, an advanced training package was developed.

Advanced training was designed for nursing and medical staff working within the NDC and HITH programs and also offered to interested individuals who had previously completed the basic training session. Training occurred at the NDC and patients were recruited for a practical component of the training package.

Simultaneous training was being provided by Sandringham Hospital in basic and advanced life support, triage within the emergency department and projects were taking place to develop an HITH service for the region and to review appropriate wound dressings that could be funded through a separate grant.

Results

Between March 2007 and August 2009, CCHS undertook six trips to the Central/East division of Fiji. Eighty-six nurses and nurse practitioners were involved in basic training. Of those surveyed, 94.2% of participants rated the quality and relevance of the workshop content as either high or very high (Figure 1).

Thirty-three participants undertook advanced training, of which 97% rated the quality and relevance of the workshop content as either high or very high (Figure 2). All participants felt more confident in managing diabetic foot wounds, and 97% felt their approach to wound management changed since attending the training sessions.

Table 1. Goals for podiatry training.

Service	Goal
Primary (community-based services)	- Identify those with diabetes-related foot complications through thorough assessment – refer and manage accordingly - Provide basic foot-care for high-risk clients - Identify those requiring more specialised services and encourage referral to NDC
Secondary (high-risk foot outpatient services)	- Up-skill NDC staff in diabetic foot ulcer management concentrating on the role of infection (including diagnosis and management) and pressure offloading
Tertiary (acute inpatient services)	- Training CWMH and HITH staff in best practice post-discharge wound management to reduce hospital length of stay

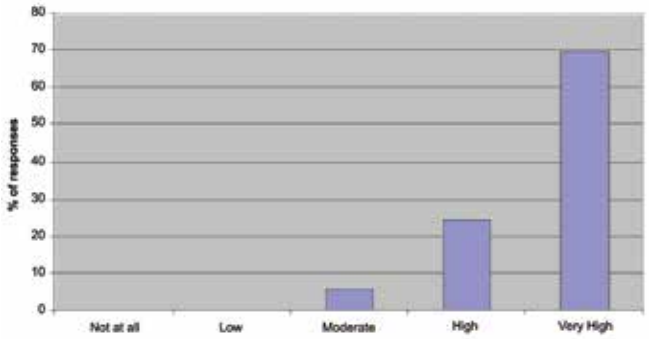

Figure 1. Basic training evaluation: satisfaction with quality and relevance of workshop content (n=86).

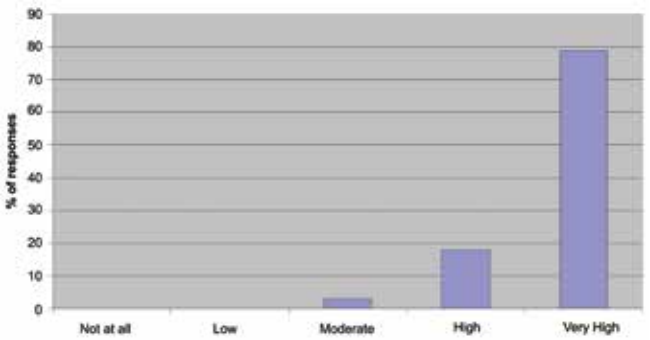

Figure 2. Advanced training session: satisfaction with quality and relevance of workshop content (n=33).

Thanks to some generous donations throughout the project, the NDC was supplied with a Doppler ultrasound, sphygmomanometer and a number of 10 g Semmes Weinstein monofilaments to assist with the identification of diabetic foot complications. At the conclusion of the project, all resources including presentations, journal articles and manuals were provided electronically to the identified champions to enable future education in the region.

Anecdotal evidence from surgical staff at CWMH suggested the rate of amputation and overall length of hospital stay had reduced following the implementation of both the podiatry training and HITH team. However, this cannot be supported by data due to limitations in health information currently collected regarding hospital admissions and statistics.

Participating podiatrists greatly appreciated the opportunity to be involved in such a program and identified an increase in job satisfaction as a result. CCHS management felt that the staff returned with a renewed enthusiasm for their profession and were pleased that we were able to support developing countries in the field of diabetic foot management.

Discussion

A number of barriers affected both the implementation and outcomes of the project. The principal barrier was the political unrest and eventual military coup which occurred during 2006 and resulted in the postponement of three visits. The interim government introduced a compulsory retirement age for workers, which resulted in the forced retirement of various key stakeholders with whom relationships had been developed and plans made. As a result of the 2006 coup, a significant staff change had been identified throughout the Fijian health sector, including numerous nurses who had participated in training being redeployed into other roles.

During the project, a considerable lack of desired resources was identified to be a barrier to reaching best practice in wound management; in particular, there was limited access to wound dressings, offloading modalities and diagnostic tools. Medical equipment is regularly donated from neighbouring countries; however, often no skills or parts existed within the region to provide servicing or repairs. Similarly, small quantities of dressing products would be donated but staff lacked appropriate knowledge about their usage and thus they would be used inappropriately and could not be restocked due to funding restrictions. A lack of understanding in best practice for managing chronic infections, particularly osteomyelitis, was evident and there are few allied health professions to assist in pressure offloading of wounds/high pressure areas and rehabilitation of lower limb amputations.

Conclusion

Foot care has been shown to be a cost-effective means of reducing the burden of diabetes on the health care system and this project has enabled over 100 doctors and nurses in Fiji to receive training on the prevention, early identification and management of diabetic foot problems. Evaluation of the program has shown a marked increase in the confidence of staff in their ability to more effectively manage the high-risk foot. Unfortunately, evidence to support the positive impacts of change in practice as a result of the training is not available; however, anecdotal evidence strongly indicates a reduction in lower limb amputation and hospital length of stay.

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